

Campbell Bridge

(Little York Bridge)

Spanning Cedar Creek at Sumner Township Road 22
Little York vicinity
Warren County
Illinois

HAER No. IL-109

HAER
ILL
94-LYORK.v
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
U. S. Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

HAER
ILL
94-LYORK.VI
1-

Campbell Bridge
(Little York Bridge)

HAER No. IL-109

Present Location: Spanning Cedar Creek on Sumner Township Road 22
Little York vicinity, Warren County, Illinois

Latitude 41 degree - 00.9 feet
Longitude 90 degree - 45.4 feet

Inventory Data: Sumner Township Road District
Section none; Station none
Structure No. 094-5410
NE 1/4 of SW 1/4 of Sec 20, T12N, R3W
Warren County

Date of Construction: 1895

Owner/Custodian: Sumner Township

Present Use: Vehicular bridge to be dismantled and relocated in Citizens Park, Monmouth, Illinois

Significance: This bridge is a relatively late example of wrought iron fabrication and the earliest known bridge in Illinois to have expansion bearings. The structure is one of two in the state identified as fabricated by the Massillon Bridge Company of Massillon, Ohio.

Historian: John B. Nolan, S.E.

I. HISTORY

Little York, population 349 in 1990, is located in northwestern Warren County on the south bank of Cedar Creek, a major stream in the county. The principal trading area is Monmouth, the county seat, eleven miles to the southeast

Little York was settled around a blockhouse in 1829 and developed as a trading center for the northwest corner of Warren County and portions of adjoining Henderson and Mercer counties. County records of 1836 order a survey for a road from Little York to Monmouth, by way of McFarland's Carding Mill and numerous turns.¹

A road has crossed Cedar Creek at the location of this bridge since earliest historic times. The first record available, an 1876 county atlas, shows a road, probably carried by an earlier bridge.²

In 1883, the Iowa Central Railroad reached the village from Monmouth and continued northwesterly, closely paralleling existing roads, to Keithsburg, where a bridge across the Mississippi was built in 1912. The railroad became the Minneapolis and St. Louis Railroad and, later, part of the Chicago and North Western Railway Company. Little York had a population of 334 in 1890. A county history reported that the railroad brought an increase in population and business to Little York. "...The buildings are all bright and new.... The people, too, are fresh, smiling, and full of hope and common sympathy...."³ The railroad stopped operating and the tracks were removed in 1973.

The Campbell Bridge is located a half-mile northwest of Little York, some 50 yards upstream from the abandoned concrete abutments of the railroad bridge. The railroad tracks were some ten feet higher than the present road, but the roadbed embankments have now been leveled in nearby fields.

A 1902 map of Illinois bicycle routes indicates this road as a trail to Seaton. In 1938, one of the first maps issued by the Department of Public Works and Buildings identifies this route as unimproved but programmed for improvement from Little York to Bald Bluff, further to the northwest.⁴

The bridge was named after the owner of the surrounding land, Clyde Campbell, who acquired the property in the mid-1970s. No record has been found of any other names used earlier for the bridge.

The Campbell family's presence has been visible in the area since William R. Campbell, the great-grandfather of the present owner, arrived from Ireland in the middle of the last century. According to folklore, old W. R. "was an irascible man, sharp of wit, who recognized opportunity and seized it by all accounts. A man ... who gave new meaning to the word cantankerous during his three score and ten years on this earth."⁵

II. THE BRIDGE

A. The Bridge Type

The Campbell Bridge is a single Pratt through truss span with six panels, including full panel sloping end posts and diagonal bracing of classic Pratt design.

The Pratt truss type, an indigenous early American bridge design, was developed as the weight of early locomotives became too great for wooden structures. Earlier bridges of this type used vertical wooden columns in compression and diagonal wrought iron rods for tension members. Early bridge companies adapted the bridge for wrought iron assembly but, after the 1890s, changed to steel, as that material became more available and reliable.

In the latter decades of the nineteenth century, most bridge design and fabrication projects were carried out by small independent bridge companies. Several hundred bridge companies appeared, flourished for a time, then merged or disappeared. There were no national quality standards, and many companies developed and patented designs which allowed them to build unique, if not better, bridges. As fabricators fiercely competed to outsell and outproduce, their products were promoted by drummers and illustrated catalogs to often-inexperienced county road commissioners.⁶ To the credit of the manufacturers, majority of the bridges were in service for many years and carried traffic heavier than the 10-ton steam tractors sometimes used as design loads.

Pin-connected Pratt trusses were the most widely used metal trusses into the early twentieth century. These bridges, an American phenomenon, were readily adaptable to fabrication in small shops, dismantlement for shipment, and simple reassembly at the site, frequently by inexperienced construction crews. Iron trusses with pin connections were universally accepted in the United States, but rarely used elsewhere.⁷ Use of the type declined as reliable methods of field riveting were developed.

As bridge fabrication progressed from an art to a science, builders of spans exceeding a hundred feet learned to provide for changes in lengths due to temperature effects, a maximum change of about 1-1/4" in one hundred feet of bridge. The Campbell Bridge is the earliest known example in Illinois to provide for expansion. Bearing nests consisting of four rollers, 1-1/2" in diameter, in a frame between bearing plates provided for movement at the western ends of the trusses. The rollers, reported by a resident to have been renovated a number of years ago, are no longer operational. Small diameter rollers were unsuccessful and bearing designs were improved within the following decade.

One of the cast iron nameplates originally mounted above the portal bracing is preserved and in the custody of the county. It reads:

MASSILLON BRIDGE CO.,
1895
MASSILLON, OHIO

The plate, 18" by 39" in overall dimensions, has an arched top and elaborate scrollwork ends.

The built-up members of this structure are carefully fabricated and functionally proportioned. the architectural treatment is basic and, unlike many late nineteenth century bridges, is without superfluous ornamentation.

B. The Manufacturer

The Massillon Bridge Company

As railroad lines expanded in the mid-nineteenth century, some local iron foundries began to expand businesses to include an occasional iron bridge, and a few grew towards specialization. In 1840, John Laird, who operated a foundry in Canton, Ohio, expanded his work to the building of bridges, becoming one of the first bridge builders in Ohio and the first in Stark County, a county which gave rise to several other well-known bridge firms, such as the Wrought Iron Bridge Company, the Canton Bridge Company, and the Massillon Iron Bridge Company.⁸ Bridges of these companies are found in Illinois.

The Massillon Iron Bridge Company was founded in 1869 by a partnership led by Joseph Davenport, an inventor and builder who, in 1840, built the first cow-catcher. In 1887, the company was incorporated as the Massillon Bridge Company and, in 1894, had a plant capacity for 6,000 long tons of steel. The bridge business flourished and, in 1903, the capital was increased to \$150,000. The following years brought additional name changes until the Depression when the plant became a division of the Fort Pitt Bridge Works of Pittsburgh. It closed in 1943.⁹

In the last available report, 1903, the Massillon plant had an annual operating capacity of 8,000 long tons, an output ranking it seventh of twenty-one companies in Ohio.¹⁰

The only other bridge in Illinois known to have been built by the Massillon Works is structure number 051-3025, located on FAU 8455 over the Embarras River at the north edge of Lawrenceville in Lawrence County. Built in 1885, this bridge is a ten panel through Pratt truss, with a length of 167 feet.¹¹

C. The Structure Description

One span, through Pratt truss; principally wrought iron

Lengthen originally about 98'0", six panels approximately 16'4"

Distance center to center of truss: 14'10"

Clear roadway width: 14'1", railings have been removed

Height between upper and lower chord centers: approximately 17'11"

Clear height above the roadway at portal: approximately 14'-6"

Truss members are symmetrical about center, U3-L3

Upper chords and LO-U1 end posts:

Built-up members, two 6" x 1-3/4" channels with 10" x 1/4", full length top plates with rivets at 6" centers; single lacing on bottom, 1-1/2" x 3/16", rivets at 8" alternate centers.

Lower chords:

L0-L1, L1-L2, two eyebars 2-1/2" x 1/2", loop ends

L2-L3, two eyebars 2-1/2" x 3/4", loop ends

Verticals:

U1-L1, square rods 7/8" x 7/8", loop ends

U2-L2, U3-L3, built-up post: two 5" x 1-3/4" channels, toes in, 6" back to back, 1-1/2" x 3/16" shingle single lacing, each side at 8" alternate centers

Diagonals:

U1-L2, two eyebars 2-1/2" x 5/8", loop ends

U2-L3, two square rods, 1" x 1", loop ends

U3-L2, one counter rod, 3/4" round, loop ends; upset threads, sleeve nut

Floor beams:

Rolled beams, 12-1/8" x 5-1/8" xx 3/8" web
U-hangers, L1-L3, 7/8" x 7/8" square rods bent around pin, upset threads, bottom
support plate 10" x 4-1/2" x 1/2"

Bottom lateral cross-bracing:

L0-L1, 1-1/8" round rods, loop ends pinned to abutment bearings
L1-L3, 7/8" round rods, all other rod ends bolted through bent plate sockets at ends of
floor beams.

Stringers:

Six I-beams, 6" x 3-1/2"; two channels, 6" x 1-3/4"

Floor:

3" x 10" planks at 12", transverse
Three 3" x 10" plans, each track

Pins:

All pins 2-1/2" round; cap nuts on 2" round threads

Rivets:

3/4" round in main members

Top lateral struts:

About 5" deep between L backs, two Ls about 2" x 2"; toes out, top and bottom, light
double lacing; without knee bracing

Top lateral cross bracing:

3/4" round approximate in each panel

Portal bracing:

Light lattice assembly 2' 6" high with integral lattice knee bracing, 2' 6" x 2' 6". Frames
of two Ls about 2" x 2". Diagonal knee frame lacing extends to top of portal. Top of
portal frame is anchored to top chord with U1 pins.

Bearings:

East truss bearings are fixed, consisting of a pin connection, an angle plate bracket and a 16" x 1' 3" x 5/8" base plate bolted to the caisson top plate with two 7/8" anchor bolts.

West truss bearings have roller nests with four 1-1/2" round roller bars in a 10" x 10-1/2" frame, with bearing plates, 1/2" top and 5/8" bottom. The rollers are free of rust, but are inoperable. Continued expansive forces have pushed the upper bearing plates 7" and sheared two restraining bolts. This movement is an indication of either bridge elongation, the likely cause, or forward tilt of the caissons.

Substructure:

The abutments consist of two sheet metal caissons, one under each truss bearing. The caissons, known as "tubes" at the time of erection, are 36" in diameter, with a 2" x 1/4" angle bolted around the top circumference and a top cover plate attached with eight 1/2" round bolts through the outstanding angle leg. Bolt threads and nuts are oiled.

The banks of Cedar Creek are steep, and normal water level is about 15' lower than the bridge deck. The abutment caisson tops are about 2' above ground and about 15' back from the high bank, an uncommon occurrence. It is assumed that the caissons are supported on footings placed in the bank.

D. Present Condition and Modification

The bridge has been well maintained and is in sound condition; expansion at the west abutment has kept eyebars and counters snug. Pin assemblies are tight and clean. The bridge is well proportioned and carefully fabricated. However, truss members appear to be generally of lighter weight than similar steel bridges of the period.

A recent impact has bent the U2-L2 vertical post on the southwest side above the floor level. The bridge is posted for five tons. Several indications identify the bridge members as wrought iron: [1] Rusting has not progressed past the patina stage; [2] cover plates on the end posts and upper chords have no wrinkles due to rust build-up between stitch rivets; [3] a short section of the interior surface of a vertical post channel web has split and peeled outward, apparently a laminar fault due to slag inclusion, a characteristic of wrought iron; and [4] the use of loop bars instead of drilled eyebars.

Specification adopted in 1910 by the American Railway Engineering Association (AREA), allowed an ultimate strength for wrought iron as 50,000 psi and 60,000 psi for structural steel.¹² The use of wrought iron in this structure is unusual, for in the 1890s many fabricators were turning from wrought iron steel, since improved material would provide equal strength with lighter weight. The strength of welded steel members was suspect and, as late as 1908, a

detailing textbook cautioned "On account of the difficulty and uncertainty in welding steel (loop rods) are usually made of wrought iron."¹³

With the exception of the total removal of the railing, there are no apparent modifications of the original structure.

E. Ownership and Future

The Campbell Bridge is owned and maintained by Sumner Township. Due to the narrow roadway and low load carrying capacity, Warren County has scheduled a replacement of this structure in the immediate future.

Preservation of this bridge at the present location is not feasible due to the high banks and a sharp bend in Cedar Creek. This is no suitable alternate site for relocating the present roadway.

Plans have been made to dismantle the bridge and re-erect it for pedestrian use in Citizens Lake Park on the west edge of Monmouth. The Illinois Department of Conservation is undertaking this project with the assistance and funding of the Illinois Department of Transportation and the Monmouth Preservationists, Tom Arthur, president.¹⁴

III. ENDNOTES

1. Newton Bateman, ed., History of Warren County, [Illinois]. (Chicago: Munsell Publishing Co., 1903), p. 705.
2. Illinois Counties of 1876 [An Atlas]. (Reprint ed., Knightstown, Indiana: Mayhill Publications, 1972).
3. Portrait and Biographical Album of Warren County, Illinois. (Chicago: Chapman Brothers, 1886), p. 748.
4. Mendenhall's New Road Map of Illinois. (Cincinnati, Ohio: C. S. Mendenhall, 1902).
5. Bill Campbell, "What would W. R. make of all this fuss?" (Monmouth, Illinois: Review Atlas, June 26, 1992), p. 2; and conversation with Clyde Campbell, Little York, Illinois, July 10, 1992.
6. David Plowden, Bridges: The Spans of North America. (New York: Viking Press, 1974), p. 67.
7. Ibid., p. 62.
8. Edward Thornton Heald, "Bridge Builders of Canton and Massillon," The Stark County Story (Canton, Ohio: 1949), p. 628ff.
9. David H. Miars, A Century of Bridges. (Wilmington, Ohio: Cox Printing Company, 1972), p. 6.
10. Victor C. Darnell, Directory of American Bridge Building Companies, 1840-1890. (Washington, D.C.: Society for Industrial Archaeology, 1984), pp. 54, 79.
11. Illinois Department of Transportation, Historic Bridge Preservation List. (Springfield, Illinois: Bureau of Location and Environment, 1992), p. 310 1a.TP.
12. Milo S. Ketchum, C.E. Structural Engineers Handbook. (Chicago: McGraw-Hill, 1924), pp. 261, 263.
13. "Bridge Members and Details," I.C.S. Reference Library. (Scranton, Pennsylvania: International Text Book, 1908), Sec. 72, p. 64.
14. Conversation with Ronald Wallace, Warren County Superintendent of Highways, Monmouth, Illinois, June 26 and July 2, 1992; and Clyde Campbell, Little York, Illinois, July 10, 1992.

IV. BIBLIOGRAPHY

A. Books:

Bateman, Newton, ed. History of Warren County, (Illinois), Chicago: Munsell Publishing Co., 1903. [Township history]

Darnell, Victor C. Directory of American Bridge Building Companies, 1840-1900, Washington, D.C.: Society for Industrial Archaeology, 1984. [An authoritative source book published by a branch of the Smithsonian Institution.]

Heald, Edward Thornton. The Stark County Story, Canton, Ohio: 1949. ["Bridge Builders of Canton and Massillon," a historical vignette written for a radio series.]

Ketchum, Milo S., C.E. Structural Engineers' Handbook, Chicago: McGraw-Hill, 1924. [An early classic on bridge design practices, originally published in 1908.]

Miars, David H. A Century of Bridges, Wilmington, Ohio: Cox Printing Company, 1972. {A well documented history of the Champion Bridge Co. of Wilmington, Ohio, discusses the growth of steel industries and bridge companies in Ohio.]

Plowden, David. Bridges: The Spans of North America, New York: Viking Press, 1974. [An overview and illustrated history of the advancement and romance of bridge building.]

"Bridge Members and Details," I.C.S. Reference Library, Scranton, Pennsylvania: International Textbook Co., 1908.

Portrait and Biographical Album of Warren County, Illinois, Chicago: Chapman Brothers, 1886. [Township history]

B. Newspapers:

Campbell, Bill. "What would W. R. make of all this fuss?", Monmouth, Illinois: Review Atlas, June 26, 1992, p. 2.

C. Pamphlets

Prairie Farmer's Reliable Directory of Warren and Henderson Counties, Kokomo, Indiana: Prairie Farmer Pub. Co., 1918.

D. Maps:

Illinois Counties of 1876 [an Atlas], Reprint and Knightstown, Indiana: Mayhill Publication, 1972.

Mendenhall's New Road Map of Illinois, ... Showing Through Bicycle Routes, Cincinnati, Ohio: C. S. Mendenhall, 1902.

Map Showing Construction Progress on Federal Aid and State Bond Issue Roads, State of Illinois, Springfield: Department of Public Works & Buildings, Division of Highways, 1930.

E. Reports:

Historic Bridge Preservation List, Illinois Department of Transportation, Springfield: Bureau of Location and Environment, 1992.

F. Conversations:

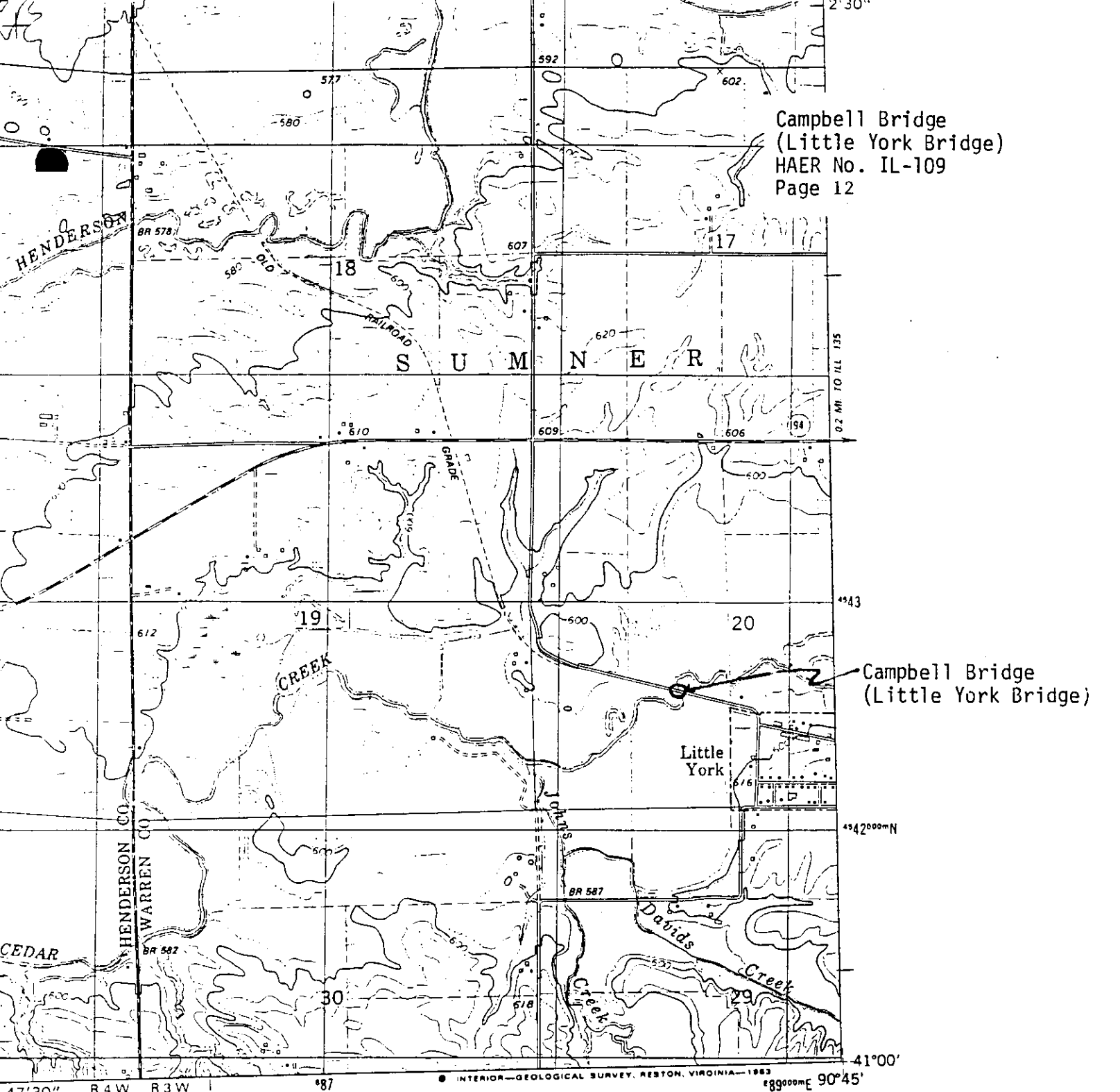
June 26, 1992 - Ronald Wallace
Warren County Superintendent of Highways
833 South Eighth Street
Monmouth, Illinois 61462
(309) 734-8518

July 2, 1992 - " " " "

July 10, 1992 - Clyde Campbell
P.O. Box 47
Little York, Illinois 61453
(309) 729-2512

Report prepared by: John B. Nolan, S.E.
66 Circle Drive
Springfield, IL 62703-4805

July 13, 1992



ROAD CLASSIFICATION

- | | |
|--|--|
| Primary highway,
hard surface _____ | Light-duty road, hard or
improved surface _____ |
| Secondary highway,
hard surface _____ | Unimproved road _____ |
| ○ Interstate Route | ○ U. S. Route ○ State Route |



SEATON, ILL.

SE/4 KEITHSBORO 15' QUADRANGLE
N4100-W9045/7.5

1982

DMA 2666 III SE-SERIES V863